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ABSTRACT

An important advance in computer assisted instruction (CAI) is the development of authoring systems that allow teachers to write software without the need for direct use of a higher level language. The primary advantage of authoring systems is that they provide teachers with the means to write CAI in plain English rather than using a computer language. Putting lesson contents completely under teacher control, these systems let teachers emphasize specific instructional objectives, give selected materials detailed treatment, or tailor remedial programs to meet the needs of individual students. Another advantage of authoring systems is that they permit modification by teachers at any time. Design features to consider when evaluating authoring systems include their instructional methods, ease of use with all instructional strategies and by all authors, flexibility, and editing and record keeping abilities. Finally, the CAI language design should include statistical programs to sort and perform elementary statistical processing of individual as well as group data. (Included is a listing of some available authoring systems.) (HOD)

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Microcomputer Authoring Systems

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Modern society is undergoing profound technological and social changes brought about by what has been called the computer revolution. Some of these changes include demands for innovative education and training, and new institutions have emerged to fill these demands. The computer revolution has placed additional stresses on traditional educational institutions that have borne the major responsibility for providing education and other public information services.

Certain characteristics of microcomputer technology suggest that it will be invaluable for education. Because of current financial constraints and accountability, microcomputers may be the only feasible way to provide good instruction in large, urban schools faced with reduced teaching staffs; in growing, suburban schools faced with larger class sizes, and in small, rural schools faced with increasing curricular offerings.

Unfortunately, development of computer software for the classroom is a very time consuming and technical process. Educational software or courseware as it is often called, is usually written in a higher level language such as Basic which requires much programming effort. Commonly used figures for writing one hour of Computer Assisted Instruction (CAI) lessons, based on Course-Writer from IBM, range from

one hundred hours for simple materials to five hundred hours for complex materials (Braun, 1978). It is doubtful that many teachers will be willing to use a system which, even after they spend much time to master it, may still require upward of one hundred hours of preparation time for each hour of course material.

Authoring systems: An overview

Perhaps the most important advance in Computer Assisted Instruction (CAI) is the development of authoring systems that allow teachers to write courseware without the need for direct use of a higher level language. Instead of trying to fit the few available software programs into an existing curriculum, authoring systems enable teachers to create software tailored specifically to their students' needs.

The primary advantage of authoring systems is that they provide teachers with the means to write Computer Assisted Instruction (CAI) in either short, simple courses or more complex versions in plain English rather than using a computer language. Authoring systems allow the teach to create lessons which operate somewhat like interactive multiple choice tests. The teacher can write questions to be asked of the student, and any information can be passed to that student before or after the question.

Custom written courses offer students the advantage of personalized and interactive software lessons. A typical teacher-made lesson would ask the student to type his name on

the keyboard, the computer would then provide information and references, asks questions, tutor the student who answers incorrectly, and reward those students who answer correctly. These programs provide the continuity of the course objectives as directed by the teacher. The student needs only to enter responses.

This same basic approach is used by the teacher to write the lessons using an authoring system. However, with the teacher at the keyboard, the questions are slightly different. The teacher can elect to enter text into the computer, to ask questions for the student to answer, to provide hints for the students or to give additional information or review for correct and incorrect responses. The teacher creates the custom courseware which is recorded and saved in the computer's memory; the student is given the lesson which the teacher created by the computer.

The variety of formats for information supplied by the teacher include text, graphics and perhaps even video cassette tapes, and synthesized speech. After the computer provides the student views this material, questions can be asked in almost any form: true-false, multiple choice, fill-in-the-blank, etc. Each wrong answer can branch the student to an appropriate response by the computer, again using the capabilities of text, graphics, video cassette tapes, and/or synthesized speech.

If a certain number of wrong answers is given by the student, the computer can be instructed to loop or move to the right answer, move to a simpler question, or provide

additional information-depending on how the teacher has written the software. At the end of an exercise or test, the computer can be programmed to add up the right and wrong answers and calculate a score. These results can be shown to the student and/or printed for the teacher for later use.

When teachers prepare a CAI lesson, the contents are completely under their control. Specific instructional objectives can be emphasized and selected material can be given detailed treatment and remedial programs can be tailored to the needs of individual students.

Another advantage of this custom software is that the teacher can modify it at any time. Currently available commercial software is usually deliberately designed to discourage such treatment, even if the teacher is fairly knowledgeable about programming.

Designing courseware

There appears to be a relatively small number of basic types of software in current use. For example, Grubb (1972) analyzed a sample of 50 CAI (Computer Assisted Instruction) programs on the basis of the instructional methods used in these programs and identified the following categories:

Drill modes of interaction
Practice
Diagnosis and prescription
Gaming and simulation
Simulation

Zinn (1967) enlarged this list and enumerated the following seven types of basic methods:

Drill
Teacher-controlled tutorial
Dialog tutorial
Simulation and gaming
Retrieval and reorganization of information
Problem solving with computation
Artistic design and composition.

When considering the design features of a CAI authoring system, instructional methods should head the list. Other features recommended by various authors are given below:

1. Ease of Use

The authoring system should be easy to use with all instructional strategies and by all authors, whether novices or highly experienced.

2. Flexibility

An authoring system should minimally enable teachers to author programs using current instructional strategies and technologies and be sufficiently flexible to allow possible expansion into presently undefined strategies and technologies.

3. Editing

The authoring system should incorporate extensive facilities for the author to edit course materials; test, debug, and update these materials; and to define information to be recorded.

4. Record Keeping

The authoring system should facilitate analyzing and recording student responses for teacher use.

5. Statistics

Finally, CAI language design should include statistical programs which would sort this data and perform elementary statistical processing of the individual as well as group data. This is, of course, easily accomplished with a computer, and therefore, is a feature of most authoring systems.

Sources of authoring systems

Several authoring systems are available which have most, but not all, of the above requirements. The simplest and cheapest systems can be copied from current microcomputer magazines at the cost of the magazine. One of the most expensive is written using PLATO from Control Data Corporation at a cost of $1500 per month. The following authoring systems and hardware requirements represent a sample of the authoring systems available:

The Computer Tutor, TI 99/4 or 48K Apple, free with purchase of magazine (Templeton. The computer tutor. Creative Computing. October 1981, 7, 150-159).

Testmaker Program, TRS-80, free with purchase of magazine (Davis. Put them to the test. 80 Microcomputing, February, 1982, 104-108).

Course Designer Authoring Package, TI 99/4A, $49. Texas Instruments Inc., North University Avenue, Lubbock, Texas.

Blocks Authoring System, 48K Apple II, $70. Published by California School for the Deaf, Computer Lab 39350 Galludet Drive, Fremont, California 94538.

CAIWARE-2D, TRS-80 Model I and III, $125. Published by MicroGnome, a Division of Fireside Computing, Inc., 5843 Montgomery Road, Elkridge, Maryland 21227.

Author I, 32K TRS-80 Model I and III, $149. Published by Radio Shack, Education Division, 400 Atrium, 1 Tandy Center, Fort Worth, Texas 76102.

The Learning System, 48K Apple, $150. Published by Micro Lab, 811 Stonegate Drive, Highland Park, Illinois 60035.

Zenith Education System, 48K Apple, $250. Published by Avant-Garde Creations, P.O. Box 30160, Eugene, Oregon 97403.

Courseware Development System I, 18K Apple II, part of $300 Genis package. Published by Bell & Howell Company, 7100 N. McCormick Road, Chicago, Illinois 60645.

Conclusions

The growth of microcomputers in schools strongly supports capitalizing on available authoring systems in the development of teachermade Computer Assisted Instruction. A study by Market Data Research (1981) revealed that 42% of the school districts in the country already have at least one microcomputer and that in the five year period from 1980-1985, there will be a 300% increase in the number of districts with micros. Their data further revealed that 30% of small school districts (under 1200 average daily membership (ADM)) have micros.

Teachers can provide quality lessons which meet the needs of their individual students through the use of authoring systems. These lessons can be produced at a lower cost and in less time than is currently possible. Although these authoring systems would be a boon to education, an authoring system would never replace the creative design of instructional materials by those programmers who can combine all of the features of a specific computer with the science

of learning and instruction. However, authoring systems would provide for the preparation of greater quantities of quality instructional materials at a much lower cost than is now the case through the use of programming languages.

REFERENCES

Braun, P. Reflections on CAI language design. April 1978, ERIC ED 087 425. 1978.

Bush, M. Course designer authoring package. 99'er Magazine. 1982, 1, 74-76.

Davis, B. Put them to the test. 80 Microcomputing, February 1982, 104-108.

Grubb, R.E. A design language and system for computer-assisted instruction programs. New York: IBM Education Research and Columbia University, 1972.

Market Data Research. Identifying and gathering your share of the microcomputer market. Westport, N.C., 1981.

Templeton, H.M. The computer tutor. Creative Computing. October 1981, 7, 150-159.

Zinn, K.L. Computer technology for teaching and research on instruction. Review of Educational Research. 1967, 27, 618-634.